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Shawangunks, as in the pine barrens, the most abundant shrub), and the substitution of *Pinus rigida*, Mill., the pine barren pine, on the mountains, for the *P. Strobus*, L., of the surrounding country, contribute to the list of plants whose natural habitat is low sandy ground rather than elevated mountain districts, though the last named may hardly be regarded as typical of sandy regions.

The reason for these somewhat remarkable occurrences is easily found in the similarity of the soil on the mountains, in chemical composition, to that of the plains bordering the coast, this being with some of these plants evidently more potent than climate, for the average annual temperature of these mountain districts is seven or more degrees lower than that of the sea-coast.\* This has its effect, however, in modifying the flora, as seen in the *Potentilla tridentata* and *Pyrus Americana*, DC., of High Point, *Stellaria borealis*, Bigel., and *Habenaria viridis*, L., var *bracteata*, Reich., of its slope; *Arenaria Grænlandica*, L., and *Juncus trifidus*, L., of Sam's Point, with other plants of northern range.

**Notes on South-western Plants.**—The appearance of Dr. Gray's long-expected work on Compositæ calls for changes in the names under which several of my plants were distributed.

\*663=*Malacothrix sonchoides*, T. & G., but the crown is plainly about 30-toothed.

\*665 } =*Senecio multilobatus*, T. & G.  
\*666 }

\*203=*Trixis angustifolia*, DC., var. *latiuscula*, Gray.

\*670=*Senecio Douglasii*, DC.

\*651=*Bigelovia Drummondii*, Gray. A form of *Bigelovia graveolens*, Gray, collected at Casuino, A. T., differs from the description in having the leaves distinctly rigid.

\*780 is not *Verbena polystachya*, but probably an extreme form of *V. stricta*, Vent. It requires further comparison.

The following notes should be published as extending the ranges of species beyond those credited to them.

*Lonicera involucrata*, Banks, Mt. Humphreys, A. T.

*Galium Rothrockii*, Gray, Mogollon Mts., N. M.

*Stevia Plummeræ*, Gray, Mogollon Mts., N. M.

*Kuhnia eupatorioides*, L., at various places in N. M., and A. T.

*Brickellia floribunda*, Gray, Burro Mts., N. M.

*Aphantostephus Arizonicus*, Gray, Central N. M.

*Erigeron glabellus*, Nutt., Mogollon Mts., N. M.

*Erigeron flagellaris*, Gray, Central Arizona.

*Erigeron Rusbyi*, Gray, Mogollon Mts. of South-western N. M., not of A. T.

*Helianthus Maximiliani*, Schrader, Central Arizona.

*Coreopsis Drummondii*, T. & G., Central Arizona.

*Schkuhria Hopkirkia*, Gray, Western N. M.

*Hymenopappus Mexicanus*, Gray, Northern Arizona.

*Polypteris Hookeriana*, Gray, Central N. M.

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\* See Mr. J. C. Smock in Ann. Rep. State Geologist for 1881.

*Actinella Bigelovii*, Gray, Northern Ariz.  
*Actinella biennis*, Gray, Central Ariz.  
*Actinella Rusbyi*, Gray, Northern Ariz.  
*Dysodia Cooperi*, Gray, Western Ariz.  
*Hymenatherum polychaetum*, Gray, Central N. M.  
*Artemisia franserioides*, Greene, Mogollon Mts., N. M.  
*Artemisia Bigelovii*, Gray, Northern Ariz.  
*Tetradymia glabrata*, Gray, Northern Ariz.  
*Senecio Neo-Mexicanus*, Gray, Central N. M.  
*Senecio tomentosus*, Mx., Clifton, South-eastern, A. T.  
*Senecio Rusbyi*, Greene, Central N. M.  
*Perezia Wrightii*, Gray, N. M. and Central Ariz.  
*Lygodesmia spinosa*, Nutt. Northern Ariz.  
*Lactuca pulchella*, HBK, Northern Ariz.  
*Taraxacum officinale*, Weber, Prescott, Ariz.

It may be well to make these notes the text of a few remarks on the topographical relations of Northern Arizona, as bearing on the constitution of its flora. The north-eastern portion of the Territory forms a continuation of the high land of Utah, the plateau terminating suddenly in a line extending from the western termination of the Colorado Cañon, south-eastward to the south-western portion of New Mexico. This line is very irregular, and exceedingly abrupt, presenting a series of broken precipices, often from 1,000 to 2,000 feet in height. To the eastward this plateau is pretty intimately connected with that of New Mexico, the shallow and gradual valley of the Little Colorado forming an avenue for, rather than a barrier to, an interchange of species. With the mountains of South-western New Mexico a direct connection is found in the forest-belt which skirts the edge of the plateau, and is known, at least in the north, as the San Francisco Forest. We should look, then, in Northern Arizona, for the representatives of four quite distinct floras, and these we actually find, all of them being represented in the short list given above. The Mohave Desert is connected by a rather gradual slope with the north-western section, but this slope at length ends abruptly at the base of the north-eastern plateau as above described. On this lowland we find many species characteristic of the South-Californian deserts. In the list, *Dysodia Cooperi*, not before reported from East Colorado River, represents this immigration. The plants of the comparatively low land of Central Arizona, such as *Coreopsis Drummondii*, *Helianthus Maximiliani* and *Perezia Wrightii*, also encroach, here in the west, on the northern section, but are elsewhere very effectually checked by the line of cliffs, so that on the plateau above, all the affinities are with the north, east and south-east. I point in the list to *Lonicera involucrata*, *Artemisia Bigelovii*, *Tetradymia glabrata*, *Lygodesmia spinosa* and *Erigeron glabellus* as well marked illustrations of this southern encroachment, all being now for the first time reported from south of the Arizona line. The last named has doubtless made its way into New Mexico by way of the elevated forest-belt referred to. From the plains of New Mexico, *Kuhnia eupatorioides* and *Bigelovia Drummondii* have moved westward, the latter obviously traveling down the Colorado Chiquito, while that Territory

has in return received *Aphantostephus Arizonicus* and *Schkuhria Hopkirkia*. But most marked of all is the interchange of species along the line of the forest-belt. The resemblance between the flora of the Mogollones of South-western New Mexico, where the summer of 1881 was chiefly passed, and that of the San Francisco and Mogollones of Arizona, where I staid in 1883, was very striking. Among the most conspicuous species in the vicinity of Clairmont, N. M., were *Pentstemon linarioides*, *Actinella Rusbyi*, *Hymenopappus Mexicanus* and *Aster canescens*, with *Helenium Hoopesii* at a higher altitude. About Flagstaff, A. T., the same species abounded, imparting a striking similarity to the landscape. *Senecio Rusbyi* was also here rediscovered and is probably to be found all the way down the highland to the New Mexican Mogollones. *Cupressus Arizonica* also follows the western side of this highland to Southern Arizona, but has not yet appeared from New Mexico. It may be added that those very interesting Mogollon Mountains of New Mexico are also very intimately connected south-westward with the mountains of Southern Arizona, from which source they have received *Galium Rothrockii*, *Stevia Plummeræ*, *Primula Rusbyi*, *Brickellia floribunda* and *B. oliganthes*.

H. H. RUSBY.

**Notes on New England Marine Algæ, IV.**—The following species have not before been reported from New England, and all with the exception of *Ulva marginata*, found by Prof. Farlow in algæ from Salt Lake, Utah, are, as far as I know, new to the United States.

*Microchaete grisea*, Thuret, Notes Algologiques, Plate xxx. On an old pecten shell at West Falmouth, Mass., in company with *Calothrix crustacea*, Thuret. Resembling a small *Calothrix*, from which it differs in having no terminal hair, the trichome ending in a rounded cell instead of a point; known heretofore only on the coast of France. I am indebted to Dr. E. Bornet for the identification of this plant.

*Nodularia litorea* (Kütz.), Thuret. A few filaments among *Lynghyæ*, *Ulvæ*, *Calothrix*, etc., in marshes at Hampton, N. H., in company with *N. Harveyana*, Thuret; the filaments are about twice the diameter of those of the latter species. Figured in Notes Algologiques, Plate xxix.

*Rhizoclonium (Linum)*, Thuret. I have found at Kennebunkport, Maine, Hampton, N. H., and Nahant, Mass., a plant which agrees with authentic specimens of this species from Cherbourg, France. The filaments are from .10 to .12 mm. in diameter, and often much curled and twisted. It seems quite distinct from the *Chatomorpha Linum* of Farlow's Manual, which is about twice this diameter, and resembles rather *Rhizoclonium tortuosum*, which, however, is only half its size.

*Chatophora maritima*, Kjellman, Spetsbergens Thallophter, Plate v., Figs. 15 and 16. At Kennebunkport, Maine, I found in an upper tide-pool, growing in a dense mass of *Calothrix scopulorum*, Ag., *Oscillaria*, etc., a few filaments agreeing with Kjellman's description and plate. They did not, however, form a definite thallus, and if they belong to this species are probably a reduced form,